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of powers and roots of complex numbers. The graphing of a function of a complex variable is indicated, as is also the use of complex numbers and the complex variable in series, with graphical illustration of the sequence S_n of a series. Here, as at the end of most chapters, good references are given from which the student may secure further knowledge on the subject treated.

The more or less usual chapter on the theory of equations is given, with an exposition of the theory of Sturm's functions and the approximation of real roots by Horner's method.

At the end of the book there is a very brief chapter on integration as the inverse of differentiation. The reviewer would approve the suggestion of the authors that this chapter "may serve for reference in later work;" for, while the chapter is interesting, it is hardly essential or even useful to the student of algebra. It would, no doubt, be of some use to a student of science, but such student would need so much more thorough work on integration, gained only by more complete study and extended practice with that very important operation, that it might be wise to devote the time which would be required for this chapter to establishing a more thorough acquaintance with material already in hand.

The following misprints were noted:

Page *XIII*, line 15, exponent of x should be $n - 1$ instead of $m - 1$; page 116, equation (2), numerator should be $2 - 3x + 4x^3$ instead of $2 - 3x - 4x^3$; page 121, line 18, read *positive* for *position*; page 156, line 9, read $\Delta y/\Delta x$ instead of $\Delta y/\Delta$; page 234, line 29, read $a_0x^n + a_1x^{n-1}$ instead of $a_0x^n + a_1x^{n-}$.

The material of the text, somewhat out of the usual line, chosen with discrimination, is arranged in a way to render the text easily read and of easy use for reference, thus making the book a valuable addition to the library of the undergraduate for reference, as well as a workable text for a class in the early undergraduate years.

MARY E. WELLS.

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PROBLEMS FOR SOLUTION.

SEND ALL COMMUNICATIONS ABOUT PROBLEMS TO B. F. FINKEL, Springfield, Mo.

2670. Proposed by CLIFFORD N. MILLS, Brookings, S. Dakota.

A telegraph wire, weighing one tenth pound per yard, is stretched between poles on level ground, so that the greatest dip of the wire is 3 feet. Find approximately the distance between the poles when the tension at the lowest point of the wire is 140 pounds.

2671. Proposed by ARTEMAS MARTIN, Washington, D. C.

Find two rectangular parallelopipedons whose edges are rational whole numbers and whose solid diagonals are also rational whole numbers and equal.

2672. Proposed by E. T. BELL, Seattle, Washington.

There is an identity in z, (1) $A(z) \equiv B(z)C(z)$; (*e. g.*, $A(z) = 1/(1 - k^2z^2)$; $B(z) = 1/(1 - kz)$; $C(z) = 1/(1 + kz)$); and the formal expansions $A(z) = \Sigma a(n)z^n$, $B(z) = \Sigma b(n)z^n$, $C(z) = \Sigma c(n)z^n$, $(n = 0, 1, \cdots, \infty)$, when substituted in (1), give, on equating coefficients, (2): $a(n) = b(n)c(0) + b(n - 1)c(1) + \cdots + b(0)c(n)$. If (2) is an identity in n, justify such a use of non-convergent series to obtain it (*e. g.*, for $|k| \geqq 1$ in the above). This method of finding important identities (2) has been used freely by Hermite and many others without question of its validity, and without offering independent proofs of (2).

2673. Proposed by WILLIAM O. BEAL, University of Minnesota.

A plane through the center of an oblate spheroid makes an angle, i, with the plane of its equator. Express the eccentricity, e', of this section in terms of the eccentricity, e, of a meridian section and the angle, i.

2674. Proposed by J. O. MAHONEY, Forest Avenue High School, Dallas, Texas.

If two sides of a triangle differ by less than a certain length, e, the two opposite angles will differ by less than a certain quantity λ, expressed in degrees, such that $\lambda < 61e/a$, where a expresses, with a possible error e, the length of the apparently equal sides of the triangle.

2675. Proposed by E. B. ESCOTT, Kansas City, Mo.

Sum the series

$$-\frac{1}{2}\cdot\frac{1^3x^3}{3}+\frac{1\cdot 3}{2\cdot 4}\cdot\frac{2^3x^5}{5}-\frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6}\cdot\frac{3^3x^7}{7}+\cdots.$$

2676. Proposed by EDWIN R. SMITH, State College, Pa.

Find the maximum term of the series

$$\frac{sp(sp-1)\cdots(sp-r+1)}{s(s-1)\cdots(s-r+1)}F(-r,\,-sq,\,sp-r+1,\,1)$$

where s, r, sq and sp are positive integers, $r < s$, p and q are proper fractions such that $p + q = 1$, and $F(-r,\,-qs,\,sp-r+1,\,1)$ is a hypergeometric series. If s, r and $s - r$ are large, show that the maximum term is approximately equal to

$$\sqrt{\frac{s}{2\pi pqr(s-r)}}.$$

2677. Proposed by R. K. MORLEY, Worcester, Mass.

A quarter-mile track is to be constructed, having semi-circular ends and straightaway sides. It is required to have the rectangular part of enclosed field referred to in No. 12, Granville's Calculus, page 116, as large as possible. Find length of the straightaways.

Also, required to inscribe the maximum rectangle in a track of length l, with semi-circular ends and straightaway sides, assuming that two sides of the rectangle are parallel to the straightaways. Find the length of the straightaways and the dimensions of the rectangle.

2678. Proposed by C. F. GUMMER, Queen's University, Kingston, Canada.

Find necessary and sufficient conditions that the roots of the equation

$$x^{n+1}+a_1x^n+a_2x^{n-1}+\cdots+a_{n+1}=0$$

may be all real and separated by the roots of $x^n + b_1x^{n-1} + b_2x^{n-2} + \cdots + b_n = 0$.

2679. Proposed by J. W. LASLEY, University of North Carolina.

Show that the perpendicular from any point on a circle to any chord of the circle is a mean proportional to the perpendiculars from that point to the tangents at the ends of the chord.

SOLUTIONS OF PROBLEMS.

Note.—Prepare solutions as follows: (1) Give the number of the problem with the name of the proposer and his address; (2) restate the problem as published; (3) then give the name of the solver with address; (4) then give the solution carefully and neatly written.